

HOW SOIL BORNE NEMATODES ENTER AND DISPERSE IN FLORIDA NURSERIES

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INTRODUCTION:

Nematodes all too often are found in Florida nurseries both on benches and in groundbed plantings. The means of nematode entry and spread in a nursery must be understood for effective containment of the pest.

NURSERY SITE:

Since plant parasitic nematodes may occupy almost all soil in which plants grow, the original nursery site, like most soil, nearly always has several kinds of phytoparasitic nematodes present in the soil before the nursery operation commences. Nematodes may be incorporated into groundbed operations, if a nursery site is selected on or near infested land.

For example, a Florida nursery site had a natural population of root-knot nematodes, *Meloidogyne* spp. Nematode-free boxwood plants (*Buxus* sp.) were replanted in cans containing previously steamed soil. The cans were placed directly on the ground. Roots growing out of the drain holes in the can and into the soil were invaded by root-knot nematode larvae occurring naturally in the soil. The nematodes invaded most of the root system of individual plants in time, causing profuse galling and severe damage to 10,000 young boxwood plants, most of which were unsalable.

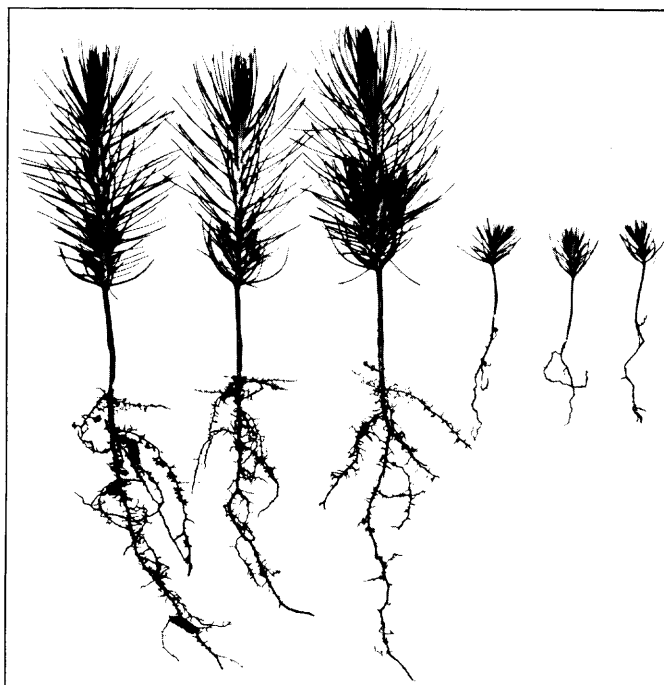


Fig. 1. Effects of sting nematodes on pine seedlings. Left: Healthy pine seedlings; Right: Pine seedlings from area where a low spot had been filled with forest soil infested with sting nematodes.

SOIL:

Soil or other planting media that has not been disinfested coming into or moved about within the nursery may carry plant-destructive nematodes. This is probably the method by which most nematode pests enter Florida nurseries. One grower trucked in soil from a nearby pine forest to fill a low area in his pine seedling (*Pinus* sp.) bed. In the following year's planting a large number of yellow, stunted seedlings appeared in the area where the fill soil was used (Fig. 1). Examination of soil from a number of areas in the nursery revealed sting nematodes (*Belonolaimus* sp.) only in the filled area but not in the rest of the nursery. Thus the grower had incorporated a permanent and serious nematode pest into his operation.

Many nurserymen purchase plants in nematode-infested soil from other growers and place them in groundbeds or on benches next to established plantings. This practice is probably the principal way burrowing nematodes become established in previously uninfested nurseries (Fig. 2).

MIGRATION:

In loose sandy soil root-knot nematodes can migrate about 1 foot laterally each month during the warm season. Over a period of years they can, if unchecked, spread throughout a nursery.

Some nematodes also move vertically into soil as deep as 12 feet. It is not economically feasible to reach them with soil fumigants at depths below 4 feet. Some are commonly distributed at lower

depths (3-5 feet) and are able to migrate upward to infect shallow-rooted plants. Consequently, eradication is impossible or nearly so in fields or groundbeds.

In one experiment, 6-inch clay pots containing grapefruit seedlings infected with burrowing nematode [*Radopholus similis* (Cobb, 1893) Thorne, 1949] were surrounded with 2 rings of similar pots but without burrowing nematodes. Normal maintenance practices were utilized. After 18 months, 17 specimens of burrowing nematodes were found in one pot in the inner ring of pots, and 165 and 52 burrowing nematodes were found in each of 2 pots in the outer ring. This was proof of plant-destructive nematodes spreading among potted plants grown under simulated nursery conditions. Contamination of this nature can be reduced by spacing containers so they do not touch.

In some instances a nematode population may migrate en masse from one crop to another. Bulb and stem nematodes [*Ditylenchus dipsaci* (Kuhn, 1857) Filipjev 1936 (T.)] migrated in such a manner from clover (*Trifolium* sp.) to strawberries (*Fragaria* sp.).

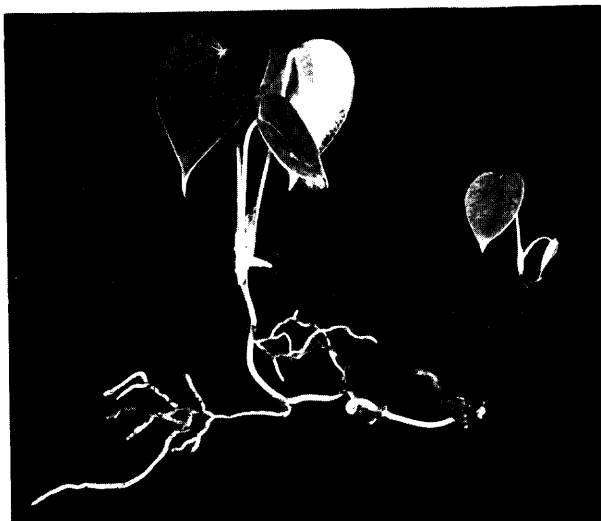


Fig. 2. Burrowing nematode-infected Anthuriums from a group introduced into a greenhouse containing many nematode-free orchids.

COMPOST PILE:

One nurseryman discarded all his cull plants including diseased plants and those with severe root-knot galling onto a huge compost pile. This contaminated multiplicity of diseases and nematodes was used without chemical or heat treatment, as part of a soil mix to pot and bed new plants. The operator stated that when the nursery was started 8 to 10 years previously, root-knot galls were unknown. At present the entire planting is infested by root-knot nematodes. This same grower was obtaining soil for greenhouse seedbeds from adjacent woods. The tragic note in this case was the fact that the grower was a hard-working, conscientious individual trying to do his very best. A lack of knowledge pertaining to nematodes, diseases, and nursery sanitation had produced his problems.

PREVENTION:

Examine field or groundbed soil for serious nematode pests prior to commencing the nursery operation. If serious pests are detected, the site should be fumigated before introducing plants. Do not place clean plants potted in disinfested soil in clean containers directly on the ground.

Do not bring untreated soil into the nursery operation. Plants in untreated soil from sites outside the nursery should not be mixed in with established nursery plants. Such plants should be held in isolation away from the nursery crop until their plant pest status is known. Compost piles must be disinfested thoroughly prior to use.

Precautions taken against the entrance and dispersal of nematodes in the nursery operation can be efforts which increase profits in a nursery through production of quality plants.

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